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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,629	01/14/2002	Yuzuru Suzuki	SUM-02301	4803

26339 7590 02/11/2005

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EXAMINER	
COMAS, YAHVEH	
ART UNIT	**PAPER NUMBER**
2834	

DATE MAILED: 02/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/046,629	SUZUKI ET AL.	
	Examiner	Art Unit	
	Yahveh Comas	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *16-18* is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Arguments

Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claim 1, 2, 4, 8-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. JP 11146616 A in view of Otsuki et al. JP Patent No. 05168181 A and in further view of Uchida et al. U.S. Patent No. 5,397,951.

Suzuki disclose a inner rotor type brushless DC motor comprising a rotor unit which is rotatably arranged within the motor and has a cylindrical field magnet (13) to

holder (14) means into which a rotating shaft (15) is press fitted at a center thereof, said cylindrical field magnet (13) being magnetized such that S and N poles alternate with each other in a circumferential direction thereof, and a stator unit (20) which is circumferentially arranged around said rotor is comprised of a plurality of stator yokes being formed by circumferentially staking a large number of thin pates each of which is constitutes a salient pole (23), and a plurality of coil units (12), each being formed by winding a magnet wire on a bobbin (19) and mounted on each of said stator yokes but doesn't disclose each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with predetermined shift amount, and the boundaries between the S poles and the N poles being formed in a stepped shape in parallel with axis of the rotating shaft.

However, Otsuki disclose a revolving magnetic field type motor comprising a rotor (20), which is rotatably arranged within the motor and includes a cylindrical field magnet (7) having a single structure, wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with predetermined shift amount for lessen the distortion of cogging torque or induced voltage (see fig. 10). The magnets are shifted from one to another around the axis of the rotor by an angle corresponding to a half of the wavelength of a first cyclic torque ripples.

However, Uchida discloses a rotor wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with predetermined shift amount for lessen

the distortion of cogging torque and the boundaries between the S poles and the N poles being formed in a stepped shape in parallel with axis of the rotating shaft.

Therefore, it would have been obvious to one having skill in the art at the time the invention was made to modify Suzuki's invention and provide each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with predetermined shift amount as disclose by Otsuki and the boundaries between the S poles and the N poles being formed in a stepped shape in parallel with axis of the rotating shaft since this would have been desirable to decrease the cogging torque.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to shift the respective stages within a range of 12° to 50°, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller, 105 USPQ 233*

4. Claim 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. JP 11146616 A in view of Otsuki et al. JP Patent No. 05168181 A., in view of Uchida et al. U.S. Patent No. 5,397,951 and in further view of Hoemann et al. U.S. Patent No. 5,034,642.

Suzuki as modify above, disclose the claimed invention except for the rotor position detection element is adjusted by ½ the shift amount of respective stages.

However, Hoemann disclose a rotor position detection element (17) is adjusted by ½ the shift amount of respective stages (25, 27 and figures 3-7) for the purpose of

maintaining an optimum sensor position relative to the rotor field without requiring physical adjustment of the sensor.

Therefore, it would have been obvious to one having skill in the art at the time the invention was made to modify Suzuki's invention and provide a rotor position detection element adjusted by ½ the shift amount of respective stages as disclose by Hoemann since this would have been desirable to maintaining an optimum sensor position relative to the rotor field without requiring physical adjustment of the sensor.

5. Claim 5, 7, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. JP 11146616 A in view of Otsuki et al. JP Patent No. 05168181 A, in view of Uchida et al. U.S. Patent No. 5,397,951, and in further view of Carrier et al. U.S. Patent No. 5,717,268.

Suzuki, as modify above, disclose the claimed invention except for the DC motor is an outer rotor type brushless three phases DC motor having eight poles and six stator units.

However, Carrier disclose a DC brushless motor with a eight poles outer rotor (10) and a six poles stator unit, wherein the number of field magnets in arrangement (28) relative to the number of poles in the stator are chosen to achieve an acceptable balance between torque ripple and switching losses.

Therefore, it would have been obvious to one having skill in the art at the time the invention was made to modify Suzuki's invention and provide outer rotor type brushless three phases DC motor having eight poles and six stator units as disclose by Carrier

since this would have been desirable to achieve an acceptable balance between torque ripple and switching losses.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. JP 11146616 A in view of Otsuki et al. JP Patent No. 05168181 A, in view of Uchida et al. U.S. Patent No. 5,397,951 and in further view of Burgbacher et al. U.S. Patent No. 4,998,032.

Suzuki, as modify above, disclose the claimed invention except for the DC motor has an inner rotor with eight poles and six stator unit.

However, Burgbacher discloses a DC brushless motor with an eight poles inner rotor (200) and a six poles stator unit (311-316) since in a rotor (200) with a larger number of poles (201), the cog height, which narrow the air gap and act like "magnetic cogs" exerting forces on the rotor that are utilized to even out the torque, can be reduce to 1/3 the height.

Therefore, it would have been obvious to one having skill in the art at the time the invention was made to modify Suzuki's invention and provide outer rotor type brushless three-phases DC motor having eight poles and six stator units as disclose by Burgbacher since this would have been desirable to reduce 1/3 of the cogs height which narrow the air gap and act like "magnetic cogs" exerting forces on the rotor that are utilized to even out the torque.

Allowable Subject Matter

Claim 16-18 allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior doesn't teach alone or in combination a DC motor comprising a rotor unit which is rotatably arranged within the motor and including a rotating shaft press-fitted to a sleeve, a single tubular field magnet and holders arranged at both ends of said field magnet, wherein said sleeve is secured on a portion of an inner periphery of said field magnet, said field magnet being magnetized such that S and N poles alternate with each other in a circumferential direction thereof, each of the S and N poles having a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said cylindrical field magnet with a predetermined shift amount; and a stator unit which is circumferentially arranged around said rotor unit and is comprised of a plurality of stator yokes so arranged as to oppose said cylindrical field magnet with a small gap, each of said stator yokes being formed by circumferentially stacking a large number of thin plates each of which constitutes a salient pole, and a plurality of coil units, each being formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yahveh Comas whose telephone number is (571)272-2020. The examiner can normally be reached on 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YC

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